

Montana

Engineering Practice Planning and Design Guide

for Ag Waste Systems

		<u>References</u>	✓
RESOURCE INVENTORY		NPPM 600.20	
See Siting factors for AWMS components		NEH, Part 651 AWMFH Appendix 8A	
IN THE OFFICE, FROM PHOTOS AND MAPS (USGS, Plan Maps, etc.):			
1.	Locate--Physical Features: Property lines, right-of-ways, buildings, corrals, haul routes and roads, feedlots, waste and feed storage areas, all utilities (overhead or buried).	NEM, Part 503.04, Buried Utilities	<input type="checkbox"/>
2.	Locate--Water Resources: Ponds, streams, wetlands, surface drainage areas, and wells (if able). Are there any defined flood plain areas that impact the site?		<input type="checkbox"/> x
3.	Locate--Fields for waste utilization, considering the soils, topography and the distance from waste sources and potential holding areas.		<input type="checkbox"/> x
4.	Locate--Problem soil (high permeability) areas from soils map information.		<input type="checkbox"/> x
5.	Identify any unique land use areas such as; woods, riparian areas, pastures, suburban development, etc., that might be affected by odors or runoff.		<input type="checkbox"/>
AT THE SITE:			
6.	Confirm the features determined above, and note any changes.		<input type="checkbox"/>
7.	Note the location of residence well and septic system for potential impacts.		<input type="checkbox"/>
8.	Look for any <u>safety items</u> , cultural resources, seeking information from the landowner.		<input type="checkbox"/> x
9.	Geologic considerations that exist at the site including the location of shallow bedrock, unsuitable soils, sand and gravel subsoils, old slide areas, sharp breaks in the slope, wetlands, etc.		<input type="checkbox"/>
LANDOWNER INTERVIEW:			
10.	Determine the types and number of livestock, and any plans for expansion.		<input type="checkbox"/> x
11.	Discuss availability and cost of getting electric power to site, if a factor.		<input type="checkbox"/>
12.	Property line and ownership considerations.		<input type="checkbox"/>
13.	Water resources available for use to create a slurry as a handling method.		<input type="checkbox"/>
14.	Management factors: ▪ Type of waste application equipment used, and options for future use ▪ Present fertilization and soils testing program ▪ Types of crops grown and yield goals for each crop.		<input type="checkbox"/> x
15.	Collect initial topographic information for the service area. This often can be accelerated by study of USGS Quadrangle maps, or GPS surveys.		<input type="checkbox"/> x

Waste Management System and Components

DEVELOPING AND EVALUATING ALTERNATIVES		<u>References</u>	✓
1.	Determine capacity requirements for wastes, wash water, flush water, feed spillage bedding, and runoff as necessary for the site.	FOTG, AWMFH	<input type="checkbox"/> x
2.	Collect detailed topographic survey data, soils information, flood plain, and water table elevation details that apply to the alternatives being evaluated.	EFM NEH, Part 650	<input type="checkbox"/> x
3.	Examine site geology (seek needed assistance). Gather soil mechanics test samples for foundation, earthfill, and compacted soil liners as needed.	AWMFH Appendix 10d	<input type="checkbox"/> x
4.	With soil conservationist, develop waste utilization plan based on landowner's application method and projected crop yield goals.	FOTG	<input type="checkbox"/> x
5.	Evaluate the need and benefits of filter strips, buffers and wind breaks.	FOTG	<input type="checkbox"/>
6.	Develop preliminary designs for the pond, stacking slab, tank, diversion or other components needed to complete the collection and storage system.	NEH, Part 650 AWMFH	<input type="checkbox"/> x
7.	Develop preliminary cost estimates for all system components.		<input type="checkbox"/> x
8.	Evaluate the cost and time inputs required for the operation and maintenance of collection and waste utilization systems. Consider cold weather effects.		<input type="checkbox"/>
9.	Review alternatives for collection, storage, and waste utilization system as well as the benefits, and costs with the landowner for a decision on a chosen alternative. Inform the landowner of their responsibility to obtain any state permits (see Montana Pollutant Discharge Elimination System Application for Permit to Discharge - Short Form B).		<input type="checkbox"/> x
10.	Determine Job Class and required approval authority, schedule the geologic investigation, other specialists, and design review as needed (MT-ENG 1).		<input type="checkbox"/> x
IMPLEMENTING DECISIONS			
<u>Collect Final Data for Design</u>			
1.	Additional detailed engineering surveys which were not obtained during initial planning. This may involve detailed bench level, transit, EDM, or Survey Grade GPS.	TR62 EFM, Ch. 1	<input type="checkbox"/>
2.	Collect any site data for the chosen alternative not previously obtained.		<input type="checkbox"/>
3.	Gather data to assist the landowner, as needed, in completion of Montana Short Form B (see Item 9 above in Developing and Evaluating Alternatives).		
<u>System Design</u>		FOTG	
<u>(See Planning and Design Guide for Final Design and Implementation.)</u>			
1.	Detailed hydraulics and hydrology which were not done previously. (Use approved computer programs to aid in calculations.)	NEH, Part 650 Chap. 2 and 3	<input type="checkbox"/> x
2.	Compute final waste volumes if changed from preliminary sizing.		<input type="checkbox"/>
3.	Complete final design, drawings, and specifications of chosen alternative.		<input type="checkbox"/> x
4.	Develop final cost estimate and the operation and maintenance plan.		<input type="checkbox"/> x
5.	Forward waste volumes and handling details to the conservationist and assist in the development of the final nutrient management plan.		<input type="checkbox"/>

Waste Management System and Components

	References	✓
6. Complete quantity calculations (as needed for cost share or contracting). ▪ Schedule of pipe sizes, type and rating. ▪ Concrete quantity and reinforcement steel requirements. ▪ Earthfill and Compaction requirements.		<input type="checkbox"/> x <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
Check all required job approvals for final design for engineering components, as well as those needed for waste utilization and nutrient management.		
<u>Drawings and Specifications</u>		
Minimum drawings shall include: ▪ Location map with scale and legend as needed or enough description on plan view map to adequately locate job. ▪ Plan view map showing location waste production areas and layout of all diversions, pipelines, structures, filter strips, ponds, slabs, etc. ▪ Typical cross sections for ponds, diversions and other critical details. ▪ Profiles for ditches and pipelines. ▪ Plan and sectional views for floor, footings, walls and covers, including steel placement for concrete structures (tanks, stacking slabs, etc.). ▪ A list of estimated quantities. ▪ A complete set of specifications relating to liner material and compaction requirements, or mill thickness for fabricated liners as well as any pipe quality specifications shall be made. If there is any concrete structural work, the type of concrete and reinforcing steel details shall be described.		<input type="checkbox"/> x <input type="checkbox"/> x <input type="checkbox"/> x <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> x <input type="checkbox"/>
<u>Construction Compliance Checking</u>	EFM, Ch. 17	
1. As in all construction - SAFETY FIRST!		<input type="checkbox"/> x
2. When quantity measurement of components must be made for payment purposes, measurement should be made on the ground based on actual surveyed information. Surveys should include elevations, top width, side slopes, profile grades, and other details shown on the drawings.		<input type="checkbox"/>
3. Various construction tests maybe required, such as moisture density tests for earthfill and soil liners, and concrete slump tests, or compression cylinders.		<input type="checkbox"/>
4. Document all inspection tests, pipeline markings and details of any elements		
5. Make sure that any needed critical area seeding has been properly completed. Explain to the cooperator the need to watch for settlement and erosion to fills, ditch, and diversion areas.	EFM, Ch. 17	<input type="checkbox"/>
When installation is done, review all elements of the O & M plan with the operator. Review of the waste utilization and/or nutrient management plan by the soil conservationist may be accomplished at the same time.		<input type="checkbox"/> x

✱ This activity or documentation is usually required on each job.